REMARKS

In this reply, there are no amendments to the claims. Accordingly, claims 1-31 remain present in this application. Applicant respectfully requests reconsideration and allowance of the present application.

In the latest Office Action, claims 1-31 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,192,305 to Schiffmann. Applicant submits that the claims are not anticipated by Schiffmann for the reasons discussed below.

The present invention as claimed provides for a roll angle estimation apparatus and method for predicting a future roll angle of a vehicle and a rollover sensing apparatus and method for predicting an overturn condition of a vehicle. The roll angle estimation apparatus includes an angular accelerometer for sensing angular acceleration of a vehicle and producing an output signal indicative thereof. Additionally, the roll angle estimation apparatus includes an integrator for integrating the sensed angular acceleration signal and producing an angular rate. Further, the apparatus includes a predictor for predicting a future roll angle of the vehicle as a function of the sensed angular acceleration, the angular rate, and a current roll angle. The rollover sensing apparatus further includes a comparator for comparing the predicted future roll angle to a threshold value and an output for generating an output signal indicative of an anticipated vehicle overturn condition prediction based on the comparison.

By employing the angular accelerometer, the apparatus and method of the present invention enable early decisions to be made with high confidence through increased accuracy of extrapolated vehicle rotation. The present invention employs an angular accelerometer, in contrast to angular rate sensors which, as discussed in the background of the invention of Applicant's application, tend to be relatively complex and expensive and require differentiation to provide an acceleration value which is inherently error-prone. Accordingly, the present invention advantageously provides for a less expensive, less complex, and less error-prone apparatus for estimating roll angle and predicting an anticipated vehicle overturn condition.

In contrast, the Schiffmann patent discloses a rollover sensing apparatus for predicting rollover or pitchover conditions of a vehicle. The apparatus shown in Schiffmann employs three accelerometers, namely a lateral accelerometer 14, a longitudinal accelerometer 18 and a

vertical accelerometer 20, in addition to a roll angular rate sensor 12 and a pitch angular rate sensor 16. Each of the accelerometers employed in Schiffmann are linear accelerometers. The Schiffmann patent at column 13, lines 18-23 states that methodology 290 estimates the roll and pitch angular accelerations as provided in block 294, and further states that a separate, simple Kalman filter may be used to estimate the time-derivatives of the bias-corrected measured roll rate and pitch rate signals to provide the estimated roll and pitch accelerations.

In order to anticipate a claim, the prior art reference must teach each and every limitation of the claim. While the Schiffmann patent estimates roll and pitch angular accelerations in block 294, Schiffmann does so by estimating the time-derivatives of the bias-corrected measured roll rate and pitch rate signals to provide estimated roll and pitch accelerations. Thus, Schiffmann requires the use of roll rate and pitch rate sensors, as opposed to an angular accelerometer.

Further, Schiffmann does not teach further integrating the sensed angular acceleration signal and producing an angular rate, and predicting a future roll angle of the vehicle as a function of the sensed angular acceleration, the angular rate, and a current roll angle. Instead, the Schiffmann patent derives roll and pitch angle by integrating the sensed roll and pitch rate signals. The sensed roll and pitch rate signals are sensed by rate sensors and are not derived from sensed angular acceleration signals. Nowhere does Schiffmann teach integrating a sensed angular acceleration signal. The Examiner has pointed to integrator 110 shown in FIG. 2A of Schiffmann which receives pitch and roll rate signals along with pitch and roll rate bias signals and provides an integration responsive to roll and pitch angle estimates. Integrator 110 does not integrate a sensed angular acceleration signal and produce an angular rate, but instead receives rate and angle information and outputs updated estimates of current pitch and roll angles.

Accordingly, the Schiffmann patent does not teach each and every limitation of independent claims 1, 10, 18 and 25, and the rejection of claims 1-31 under 35 U.S.C. §102(b) based on Schiffmann should therefore be withdrawn, which action is respectfully solicited.

By way of the foregoing discussion, Applicant has demonstrated that the claims are not anticipated by the Schiffmann patent, and the rejection of claims 1-31 under 35 U.S.C. §102(b) should therefore be withdrawn.

The prior art made of record in the latest Office Action was not applied to the claims and thus is not discussed in detail herein. Applicant has reviewed the Breed reference and agrees with the Examiner that such reference does not teach or suggest Applicant's claimed invention.

Finally, Applicant submitted a Supplemental Information Disclosure Statement on September 30, 2005, but have not received acknowledgement from the Examiner. Applicant respectfully requests that the Examiner acknowledge consideration of the art cited in the Supplemental Information Disclosure Statement by initialing the PTO form 1449 and returning a copy of the initialed form to Applicant.

In view of the above remarks, it is submitted that claims 1-31 define patentable subject matter and are in condition for allowance, which action is respectfully solicited. If the Examiner has any questions regarding patentability of any of the claims, the Examiner is encouraged to contact Applicant's undersigned attorney at the Examiner's convenience.

Respectfully submitted,

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